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A.D. 1870, 2nd DECEMBER. N° 3169.

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SPECIFICATION

OF

HENRY YOUNG DARRACOTT SCOTT.

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TREATMENT OF SEWAGE, &c.

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### Treatment of Sewage, &c.

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**LETTERS PATENT** to Henry Young Darracott Scott, of Ealing, in the County of Middlesex, Lieutenant-Colonel Royal Engineers, for the Invention of “**IMPROVEMENTS IN THE TREATMENT OF SEWAGE AND IN THE PREPARATION OF MATERIALS TO BE USED FOR ITS PURIFICATION.**”

Sealed the 26th May 1871, and dated the 2nd December 1870.

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**PROVISIONAL SPECIFICATION** left by the said Henry Young Darracott Scott at the Office of the Commissioners of Patents, with his Petition, on the 2nd December 1870.

I, HENRY YOUNG DARRACOTT SCOTT, of Ealing, in the County of  
5 Middlesex, Lieutenant-Colonel Royal Engineers, do hereby declare the nature of the said Invention for “**IMPROVEMENTS IN THE TREATMENT OF SEWAGE AND IN THE PREPARATION OF MATERIALS TO BE USED FOR ITS PURIFICATION,**” to be as follows :—

The objects of this Invention are, 1st, to obtain a more perfect system  
10 for the deodorization and precipitation of sewage matter than any



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now in use ; 2nd, to provide a less expensive and more efficient mode of compounding and using the chemicals employed in the deodorization of sewage.

In carrying out my Invention in lieu of placing the precipitating and filtering beds in close proximity or combining them in one establish- 5  
ment I introduce my precipitating chemicals in the sewers at points far removed from the filtering beds at the various man-holes, or at points specially arranged for the purpose throughout the entire system of sewers, and finally at the outfall make use of the depositing tanks and filtering beds to arrest the solid fecal matters and other precipitates 10  
which the chemicals have thrown down. By this arrangement the precipitates formed will have time to aggregate so that they cannot readily be washed through the filtering beds. Moreover the sewage matter undergoes purification while flowing through the drains, and thereby the escape of much noxious gas into our streets and houses is 15  
prevented. And further, when lime and metallic salts are used in conjunction time is given to the precipitates first thrown down to rearrange themselves in their most stable form, whereby the metallic salts can be better proportioned to the work for which they are specially suited, viz., the production of sulphides whilst the lime takes to itself the 20  
carbonates and phosphates with which it forms more insoluble compounds than with sulphuretted hydrogen. I may also establish at intervals along the line of sewers shafts or towers in which proper arrangements being made for collecting ammonia, this valuable substance may be collected at little cost or labour as it is evolved from the sewage 25  
by the action of the lime.

In order properly to regulate the addition of chemicals at the various man-holes or other stations I provide hoppers or vessels fitted with mechanical arrangements for yielding to the sewage water a continuous supply of disinfecting chemical compound. This supply may be made 30  
to vary in amount (by simple mechanical contrivances) with the hour of the day, and the consequently increasing or decreasing quantity of sewage requiring to be treated.

In lieu of treating the sewage with the ordinary quick lime of commerce to precipitate the carbonates and phosphates, I sometimes make 35  
use of the compound resulting from the calcination under oxidizing influences of the refuse taken from the lime purifiers of gas works. Other alkali refuse may be similarly used.



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Also in the manufacture of disinfecting balls, such as were described by me in the Specification of a Patent granted to me for Improvements in the Treatment and Deodorization of Sewage Water," dated October 31st 1865, No. 2808. I now propose to substitute for the lime and sulphate  
5 of lime therein mentioned as suitable for the preparation of such balls, the said lime compound formed from the lime refuse of gas works, by subjecting it to oxidizing calcination. This material has in itself an inherent power of setting and thereby of assisting the manufacture of solid manures which will bear transport.

10 I further improve the quality of the said balls by incorporating with the lime and sulphate of lime (or other soluble sulphate used to control the slaking properties of the lime) together with other disinfectants, as described in the before-mentioned Patent, crystals of metallic salts suitable for precipitating sulphuretted hydrogen, and also crystals of  
15 other alkaline disinfectants. Such disinfecting balls may be employed for introducing the necessary chemicals into the sewage water in lieu of the ordinary quick lime of commerce, or in lieu of quick lime used in conjunction with metallic salts without any special process being applied to compound them into a solid form. When the said disinfecting balls  
20 are required to bear keeping I coat them externally with a film of sulphate of lime which will preserve them from attracting the carbonic acid gas of the atmosphere, and from thereby becoming to some extent insoluble.

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**SPECIFICATION** in pursuance of the conditions of the Letters Patent,  
25 filed by the said Henry Young Darracott Scott in the Great Seal Patent Office on the 2nd June 1871.

**TO ALL TO WHOM THESE PRESENTS SHALL COME, I, HENRY YOUNG DARRACOTT SCOTT, of Ealing, in the County of Middlesex, Lieutenant-Colonel Royal Engineers, send greeting.**

30 **WHEREAS** Her most Excellent Majesty Queen Victoria, by Her Letters Patent, bearing date the Second day of December, in the year of our Lord One thousand eight hundred and seventy, in the thirty-fourth year of Her reign, did, for Herself, Her heirs and successors, give and grant unto me, the said Henry Young Darracott  
35 Scott, Her special licence that I, the said Henry Young Darracott



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Scott, my executors, administrators, and assigns, or such others as I, the said Henry Young Darracott Scott, my executors, administrators, and assigns, should at any time agree with, and no others, from time to time and at all times thereafter during the term therein expressed, should and lawfully might make, use, exercise, and vend, within the 5 United Kingdom of Great Britain and Ireland, the Channel Islands, and Isle of Man, an Invention for “IMPROVEMENTS IN THE TREATMENT OF SEWAGE AND IN THE PREPARATION OF MATERIALS TO BE USED FOR ITS PURIFICATION,” upon the condition (amongst others) that I, the said Henry Young Darracott Scott, my executors or administrators, by an 10 instrument in writing under my, or their, or one of their hands and seals, should particularly describe and ascertain the nature of the said Invention, and in what manner the same was to be performed, and cause the same to be filed in the Great Seal Patent Office within six calendar months next and immediately after the date of the said 15 Letters Patent.

NOW KNOW YE, that I, the said Henry Young Darracott Scott, do hereby declare the nature of my said Invention, and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement, reference being had to the Drawing 20 hereunto annexed, and to the letters and figures marked thereon (that is to say) :—

The objects of this Invention are, first, to obtain a more perfect system for the deodorization and precipitation of sewage matter than any now in use ; second, to provide a less expensive and more efficient mode of 25 compounding and using the chemicals employed in the deodorization of sewage.

In carrying out my Invention in lieu of placing the precipitating and filtering beds in close proximity to each other or combining them in one establishment. I introduce my precipitating chemicals in the sewers at 30 points far removed from the filtering beds at the various man-holes, or at points specially arranged for the purpose throughout the entire system of sewers. At the outfall of the sewers I make use of the depositing tanks and filtering beds to arrest the solid fecal and other matters which the chemicals have thrown down. By this arrangement the precipitates 35 formed will have time to aggregate, so that they cannot readily be washed through the filtering beds. Moreover the sewage matter will undergo purification while flowing through the drains, and thereby the



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escape of much noxious gas into our streets and houses will be prevented. Moreover when lime and metallic salts are used in conjunction for acting on the sewage time is given to the precipitates first thrown down to rearrange themselves in their most stable form. By this means the  
5 quantity of the metallic salts can be better proportioned to the work for which they are specially suited, viz<sup>t</sup>., the production of sulphides, whilst the lime will take to itself the carbonates and phosphates with which it will form more insoluble compounds than with sulphuretted hydrogen.

10 At intervals along the line of sewers I also construct shafts or towers in which proper arrangements being made for collecting ammonia in any of well-known manners this valuable substance may be collected at little cost or labour, as it is evolved from the sewage by the action of the lime thereon.

15 In order properly to regulate the addition of the chemical agents at the various man-holes or other stations I provide hoppers or vessels fitted with mechanical arrangements for yielding to the sewage water a continuous supply of disinfecting chemical compound. This supply may be made to vary in amount (by means of simple mechanical contrivances)  
20 with the hour of the day, and the consequently increasing or decreasing quantity of sewage requiring to be treated.

In the accompanying Drawing I have shewn a convenient mechanical arrangement for effecting a continuous supply of the disinfecting chemical agent to the sewage in quantities varying with the hour of day according  
25 to the increasing or decreasing quantities of the sewage that it has been found by observation and experience usually flows along the sewers at such hours.

In order to avoid unnecessary expense in adapting my Invention to the existing sewers I propose to construct (for the reception of my  
30 distributing mechanism or apparatus) a chamber or recess contiguous to the existing man-holes or other vertical openings communicating with the sewers.

The apparatus consists of a hopper *a* large enough to contain a supply of the pulverised chemical substances sufficient for from twenty-four to  
35 thirty hours. At the lower and narrow part of the hopper is a rotary stirrer or wheel *b*, which by its continual rotation keeps the pulverized chemicals at the bottom of the hopper in constant agitation, and delivers them on to a fixed perforated plate or disc *c*, below which is a second



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plate or disc  $c^1$  which is caused to rotate slowly on its axis, and performs one revolution in twenty-four hours. The perforation or opening in this latter gradually increases in width to its maximum size, and then as gradually decreases, as shewn in the detached plan view Fig. 2, so as gradually to increase and decrease the size of the opening through which 5 the chemical substances fall from the hopper  $a$ . The stirrer  $b$  and rotating disc  $c^1$  are actuated by the clockwork mechanism  $d$ , as shewn in the Drawing, and this mechanism is driven by a weight  $e$  suspended from a cord wound round the barrel  $d^1$ . A fly  $f$  is adapted to the clockwork to prevent it from running down too quickly. It will now be seen 10 that a constant but every varying supply of the chemical substance will pass through the perforated discs  $c, c^1$ , and will fall into the spout  $g$ , from whence it will drop into and become mixed with the sewage in the drain or sewer  $h$  below, and as it is carried along with the sewage the chemical substance will act upon and disinfect the sewage, and on its 15 arrival at the outfall or filtering beds the solid matters may be separated from the liquid, and the latter allowed to run off.

In lieu of treating the sewage with the ordinary quicklime of commerce to precipitate the carbonates and phosphates I prefer to make use of the compound resulting from the calcination under oxydizing influences of 20 the refuse taken from the lime purifiers of gas works. Other alkali refuse may be similarly used. The gas lime refuse is prepared by burning it in the presence of an excess of atmospheric air which supplies it with sufficient oxygen to convert the compound (which contains lime and sulphur) into sulphate of lime. 25

In like manner in the manufacture of disinfecting balls, such as were described by me in the Specification of a Patent grant to me for "Improvements in the Treatment and Deodorization of Sewage Water," dated October Thirty-first, One thousand eight hundred and sixty-five, No. 2808. I now propose to substitute for the lime and sulphate of 30 lime therein mentioned (as suitable for the preparation of such balls) the lime refuse prepared in the manner just described by subjecting it to oxydizing calcination. This material thus prepared by being converted into a coarse sulphate of lime or plaster of Paris possesses the property or power of setting like plaster of Paris; it may therefore be used for the 35 manufacture of solid disinfectants which will bear transport.

In combination with the lime refuse thus prepared by subjecting it to oxydizing calcination, or with the lime and sulphate of lime (or other



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soluble sulphate used to control the slaking properties of the lime,) I incorporate together with other disinfectants, as described in the before-mentioned Patent, crystals of metallic salts suitable for precipitating sulphuretted hydrogen, and also crystals of other known alkaline disin-  
5 fectants, and I manufacture the same into balls or other solid forms or lumps. Such disinfecting balls or lumps may be employed for introducing the necessary chemicals into the sewage water in lieu of the ordinary quicklime of commerce, or in lieu of quicklime used in  
10 conjunction with metallic salts without any special mechanism or apparatus being employed to effect their introduction. When the said disinfecting balls are required to bear keeping I coat them externally with a film of sulphate of lime, which will preserve them from attracting the carbonic acid gas of the atmosphere, and from thereby becoming to some extent insoluble.

15 Having thus described my Invention of "Improvements in the Treatment of Sewage, and in the Preparation of Materials to be used for its Purification," and having explained the manner of carrying the same into effect, I wish it to be understood that I claim as the Invention secured to me by Letters Patent as aforesaid,—

20 First. Treating the sewage water (with the chemicals employed to separate from it its impurities) at various points distant from the depositing tanks and filtering beds, and distributed over the whole system of drainage so as to attack the sewage water in detail instead of attempting to deal with it in a collected body as has hitherto been  
25 practised.

Secondly. I claim the use at various points distant from the depositing tank and filtering beds of apparatus or mechanism for effecting the introduction of the chemical disinfecting materials in varying proportions depending on the amount of sewage required to be treated at different  
30 hours of the day, as herein set forth.

Thirdly. I claim the employment of the lime refuse from gas and alkali works calcined under oxydising influences as herein set forth, in the place of the lime used in conjunction with some salt of iron (as described in the Specification of my Patent, dated October Thirty-first,  
35 One thousand eight hundred and sixty-five, No. 2808) for the purification of sewage water.



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I also claim the use of this compound prepared as herein set forth, and made into balls or lumps as described.

In witness whereof, I, the said Henry Young Darracott Scott, have hereunto set my hand and seal, the Second day of June, in the year of our Lord One thousand eight hundred and 5 seventy-one.

HENRY Y. D. SCOTT. (L.S.)

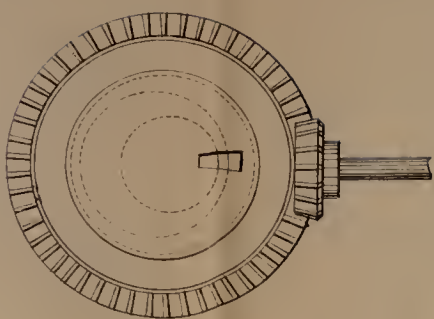
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F I G. 2.



F I G. 1.

